Title (en)

HYBRID DRIVE SHAFT USING FRICTION-STIR WELDING AND FABRICATION METHOD THEREOF

Title (de)

HYBRIDANTRIEBSWELLE MIT RÜHRREIBSCHWEISSEN UND HERSTELLUNGSVERFAHREN DAFÜR

Title (fr)

ARBRE D'ENTRAÎNEMENT HYBRIDE SOUDÉ PAR AGITATION/FRICTION ET PROCÉDÉ POUR SA FABRICATION

Publication

EP 2944411 A1 20151118 (EN)

Application

EP 14737876 A 20140110

Priority

- KR 20130003634 A 20130111
- KR 2014000306 W 20140110

Abstract (en)

The present invention relates to a hybrid drive shaft using friction-stir welding and a fabrication method thereof, and more particularly to a drive shaft comprising a metal tube, a composite material layer formed inside the metal tube, and a metal yoke connected to both ends of the drive shaft by means of friction-stir welding so as to make the components simple and lightweight and to enhance the durability, and a fabrication method thereof. The fabrication method comprises the steps of: shaping a composite material sheet into a cylindrical form by means of a mandrel; bonding the cylindrical composite material layer to the inside of a metal tube by rotating the mandrel snugly inserted in the composite material cylinder; maintaining the inside of the metal tube in a vacuum state for a given duration so as to make the composite material layer stick to the metal tube; heating the metal tube maintained in the vacuum state in an autoclave so as to mold the composite material; and adjoining a connection member for connecting other parts to the ends of the metal tube by friction-stir welding.

IPC 8 full level

B23K 20/12 (2006.01); **B23K 20/24** (2006.01); **B29C 70/34** (2006.01); **F16C 3/02** (2006.01); B23K 101/04 (2006.01); B29K 105/00 (2006.01); B29L 31/00 (2006.01)

CPC (source: CN EP KR US)

B23K 20/12 (2013.01 - KR); **B23K 20/122** (2013.01 - CN EP US); **B23K 20/129** (2013.01 - US); **B23K 20/24** (2013.01 - US); **B29C 70/34** (2013.01 - US); **F16C 3/023** (2013.01 - EP US); B23K 2101/04 (2018.07 - CN EP US); B29K 2105/256 (2013.01 - US); B29L 2031/75 (2013.01 - US); F16C 3/026 (2013.01 - EP US); F16C 2326/06 (2013.01 - EP US)

Designated contracting state (EPC)

AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR

Designated extension state (EPC)

BA ME

DOCDB simple family (publication)

EP 2944411 A1 20151118; **EP 2944411 A4 20160831**; **EP 2944411 B1 20211020**; CN 104994987 A 20151021; CN 104994987 B 20181016; ES 2897571 T3 20220301; JP 2016505789 A 20160225; JP 6580490 B2 20190925; KR 101422584 B1 20140724; KR 20140091405 A 20140721; US 2015345540 A1 20151203; US 9958003 B2 20180501; WO 2014109592 A1 20140717

DOCDB simple family (application)

EP 14737876 A 20140110; CN 201480003977 A 20140110; ES 14737876 T 20140110; JP 2015552582 A 20140110; KR 20130003634 A 20130111; KR 2014000306 W 20140110; US 201414654743 A 20140110